

Multi-Gigabit Rate Radiation Hard Bus, Phase I

Completed Technology Project (2011 - 2011)



Project Introduction

High speed robust very low power radiation hardened bus interconnects are required to accelerate on-board computations, further improve reconfigurability and upgrade capabilities of tracking systems, and provide easy system upgrade. The existing radiation-hardening techniques significantly degrade the achievable circuit's performance, reducing speed and increasing power consumption. In order to accelerate on-board computations, improve onboard autonomous navigation and time-transfer systems that can reduce DSN tracking requirements, ADSANTEC will develop Multi-Gigabit Rate Radiation Hard Bus supporting an open system architecture and providing a cost effective multi-gigabit interconnect. This development will be based on ADSANTEC's pioneering SERDES concept, supporting a variety of interfaces and operating broadband at any frequency. The design will be based on ADSANTEC's proprietary patent pending library of radiation hardened cells based on HBTs with $f_T=120/220\text{GHz}$ and will be fabricated in a commercial high-performance BiCMOS technology. Phase I was devoted for bus architecture design and computer simulations of the synchronization circuitry. The complete chip will be fabricated at tested the end of Phase II, and space (Class K) qualified at Phase II. The proposed SERDES is a revolutionary upgrade of the existing ADSANTEC's Bus solution scheduled for launch (LADEE Program) in May 2011.

Primary U.S. Work Locations and Key Partners

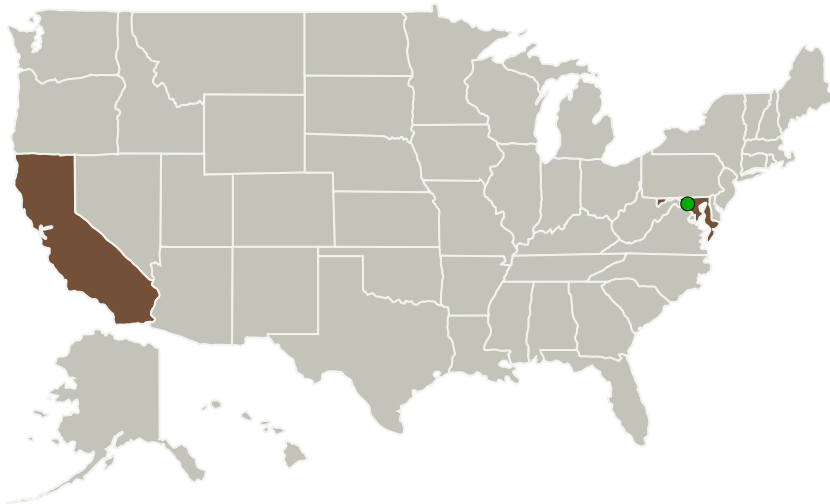
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Organizations Performing Work	Role	Type	Location
Advanced Science and Novel Technology	Lead Organization	Industry	Rancho Palos Verdes, California
● Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland

Primary U.S. Work Locations	
California	Maryland

Project Transitions

▶ **February 2011:** Project Start

✓ **September 2011:** Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/138333>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Advanced Science and Novel Technology

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Vladimir Katsman

Co-Investigator:

Vladimir Katzman

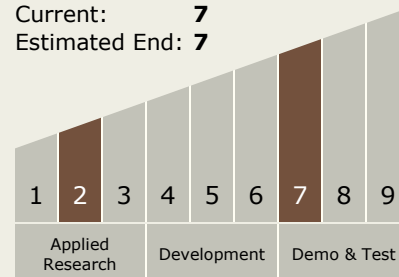
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Technology Maturity (TRL)

Start: 2
Current: 7
Estimated End: 7



Technology Areas

Primary:

- TX02 Flight Computing and Avionics
 - └ TX02.1 Avionics Component Technologies
 - └ TX02.1.1 Radiation Hardened Extreme Environment Components and Implementations

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System